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IONOSPHERIC POLAR BLACKOUT INDICES DURING 1957-1965

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ABSTRACT

Daily indices of ionospheric blackout incidence both in the polar cap and in the auroral zone are constructed for years 1957-65. The indices increase approximately as the logarithm of the total number of hours of blackouts for each U.T. day, the scale being 0 to 9. The auroral zone blackout index I_A increases generally in parallel with polar geomagnetic activity, while the index I_P indicates the degree of the PCA activity which is caused by solar cosmic ray's invasion into the polar cap. Annual mean of I_P index changes in parallel with that of Zürich sunspot numbers. Little recurrency is found in the I_P. On the other hand, the I_A index shows a clear recurrency of 27 days throughout the half solar cycle examined, suggesting that production of energetic electrons responsible for the AZA is strongly controlled by solar wind activity.

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1. Introduction

The fmin, minimum frequency evident on vertical-incidence ionograms, is a useful parameter for the study of enhanced ionization in the lower ionosphere. We may count a number of literatures that have treated polar blackout events using this parameter (see, for example, Hultqvist, 1963; Bailey, 1964).

World-wide morphology of individual polar blackouts has been established on a series of synoptic studies of typical disturbances since the IGY (Hakura, Takenoshita, and Otsuki, 1958; Obayashi and Hakura, 1960; Hakura, 1960; Hakura and Nagai, 1964-65; Hakura, 1965). There are two distinguishable types of polar blackouts; the polar cap blackouts and the auroral zone blackouts. The former starts well before the onset of a geomagnetic storm, and appears in the polar cap usually above 60° in the geomagnetic latitude. This is an enhanced ionization in the ionospheric D region, caused by the bombardment of solar cosmic radiations. The latter appears in the auroral zone, usually in connection with the elementary geomagnetic polar disturbances and the auroral displays. This is connected with precipitation of high energetic electrons produced probably in the magnetosphere.

In order to examine the long term variation of blackout activity in relation to other solar-geophysical data, construction of a daily index becomes necessary. Daily indices representative of the occurrence of polar blackouts in both the northern and the southern auroral zones were made by Piggott (1960). Using the indices during

the I.G.Y., he showed that day-to-day condition of the polar ionosphere in both hemispheres is very similar to each other, so that the index in the northern hemisphere may be taken as the representative of the polar blackout over the world.

In the present paper, the polar cap blackout index I_p and the auroral zone blackout index I_A are proposed, and calculated for years 1957-65 that cover over a half sunspot cycle. Using these indices and geomagnetic K_p indices, secular variations and 27 days recurrence tendencies of polar blackout activities will be examined and compared with those of geomagnetic activity.

2. Polar Blackout Indices for Years 1957-65

General process in constructing the polar blackout indices is what follows: (a) Numbers of hours of blackouts (fmin=B or ≥ 4Mc/s) per U.T. day are counted for several main ionosphere observing stations listed in Table 1.

Table 1
List of Vertical Ionosphere Sounding Stations

Region		Station	Corrected Geomagnetic Latitude	Geographic Longitude
Polar Cap	Main Station	Thule	86.0 N	291.3 E
		Resolute Bay	84.3	265.1
Auroral Zone	Main	Kiruna	64.3	20.5
		Point Barrow	69.7	203.2
		Churchill	70.3	265.8
	Supplementary	Tromsö	66.0	19.0
		Fairbanks	64.9	212.2
		Winnipeg	61.1	262.6
		Narsarssuak	69.0	314.6
		Reykjavik	66.5	338.3

(b) Mean numbers of hours of blackouts in the polar cap and the auroral zone are calculated and coded according to an empirical scale given in Table 2. When the data from a main observing station are missing, they are interpolated using those from a supplementary station in the same geographical zone.

Table 2

Polar Blackout Index Corresponding to Numbers of Hours of Blackout

Blackout Index, I_P or I_A	Number of Blackout per Day
0	0 - 0.4
1	0.5 - 0.9
2	1.0 - 1.5
3	1.6 - 2.5
4	2.6 - 3.5
5	3.6 - 5.5
6	5.6 - 8.5
7	8.6 - 13.0
8	13.1 - 20.0
9	20.1 - 24.0

The index increases approximately as the logarithm of mean hours of blackout for each day, U.T. The scale runs from 0 to 9, qualitatively analogous to the magnetic Kp scale.

(c) Daily values of I_P and I_A and their monthly mean values for years 1957-65 are tabulated in the Appendix. For comparison with I_A and I_P, daily sums of magnetic Kp indices, Σ Kp, are also given in the table.

(d) In Table 3, are summarized the properties of various kinds of enhanced ionization events, i.e. SID (Sudden Ionospheric Disturbance), SCA (Sudden Commencement Absorption), PCBO (Polar Cap Blackout), and

various AZBO (Auroral Zone Blackouts). The contribution of the SID and SCA to the indices is very small, because of their sporadic occurrence and short time-duration. Fig. 1 shows world-wide patterns of blackout area during typical enhanced ionizations. The AZA's, (c)-(e), occur in a limited region along the auroral zone, so that at least three well located stations are necessary in order to detect the occurrence of the blackout and obtain a world-wide index. On the other hand, one or two stations are sufficient to describe the day-to-day change in the PCBO, since the whole area above 65° are covered by the blackout condition, as shown in Fig. 1-(b).

Table 3

Various Enhanced Ionization Events and Their Contribution to Blackout Indices

Events	SID	PCBO	SCA	AZA (Magnetic Storm)	AZA (Isolated Bay)	AZA (Calm Period)
Region of Blackout	sunlit lower latitude zone	whole polar cap	auroral zone	auroral or sub-auroral zone	auroral zone	auroral zone
Duration per Event	~ 10 min.	~ day	~ min.	~ 10 min. (successive occurrence ~ day)	~ 10 min.	~ 10 min.
Contribution to Blackout Indices, I_p and I_A	(I_P, I_A) slight	I_P, I_A	(I_A) rare	I_A	I_A	I_A

3. Some statistics of I_P, I_A and Geomagnetic ΣKp Indices

3.1 Characteristics of I_P and I_A

Figs. 2-(a) and -(b) show the relation between two polar blackout indices, I_P and I_A, and daily sum of Kp index, ΣKp, in a period of January through June 1960. As expected, the auroral zone blackout I_A shows a linear relation to ΣKp. At major geomagnetic storms, however, the region of polar blackouts shows a considerable equatorward-shifting even to min-auroral zone, because of increased Dst field set anti-parallel to original geomagnetic field (Obayashi and Hakura, 1960). This intensification in blackout activity are not included in the I_A index, since the mean geomagnetic latitude of main ionospheric stations is 68.1. Thus the index I_A is considered to be a measure of enhanced ionizations accompanied with polar elementary geomagnetic disturbances.

As shown in Fig. 2-(a), there is no correlation between I_P and ΣKp. In order to show the meaning I_P more clearly, time variation in I_P's in the period of March 19 through June 7, 1960 are plotted in Fig. 3, where outstanding solar flares observed during the same period are also shown by the wedge mark ▼. As easily seen, all enhancements in I_P occurred after these outstanding flares and can be identified as the polar cap blackouts due to solar cosmic rays emitted at the times of the flares.

3.2 Solar Activity Control on ΣKp, I_P and I_A.

Secular Variations in (a) Zürich sunspot numbers, (b) ΣKp, (c) I_P, and (d) I_A are shown in Fig. 4, where annual mean values of these indices are plotted for years 1957 through 65. The geomagnetic ΣKp index shows a kind of solar cycle variation. Geomagnetic activity enhances when dense and high velocity solar plasmas attain to the earth. Mariner II plasma measurements have revealed a linear relation between daily averages of the solar wind speed and the ΣKp indices (Snyder, et al., 1963). Thus the variation in the mean ΣKp in Fig. 4-(b) suggests a secular change in the solar wind velocity. A considerable discontinuity in the mean ΣKp between 1960 and 61 can be understood as the secular changes in the occurrence frequency of geomagnetic storms. During maximum sunspot periods, most of geomagnetic storms are caused by a major solar flare and start with a sudden commencement. As shown in Fig. 5, the occurrence frequencies of the SC-storm during 1957 - 60 were more than twice as high as those during 1961-65.

It is also evident in Fig. 5 that the occurrence of the non-SC storms is most frequent during every declining epochs of four successive sunspot cycles since 1925. By their statistics, Sinno (1956-a and -b, 1964) and Goh (1964) have shown that 27 days recurrency is a predominating nature of geomagnetic storms in these declining solar activity. A remarkable 27 days recurrence tendency in 1962 - 64 is demonstrated in Fig. 6-A, where time variation in a mean autocorrelation

coefficient at intervals of 27 days of ΣKp is given. The mean was taken for each 7 successive solar rotation periods. Details of this remarkable tendency are shown on a recurrence table of ΣKp in Fig. 7-A, where the index ΣKp is coded into 6 grades as shown on the top of the figure. A peak of Kp activity appeared between 5th to 9th days persistently in the solar rotation of 1769 - 93.

Secular variation in the auroral zone blackout index I_A is rather flat in comparison with that in ΣKp, as shown in Fig. 4-(d). However, it is interesting to note that recurrence tendency in I_A is found throughout the half sunspot cycly analysed in Fig. 7-B. Two peaks of mean autocorrelation coefficients of I_A that appeared in 1959 -61 and 1962 - 64 are especially outstanding. It may be said from this clear recurrency in I_A that the production of energetic electrons responsible for the AZA is strongly controlled by solar wind activity, even though the acceleration is taken place in the geomagnetosphere.

Finally, the I_P index shows a clear solar cycle variation, as already noted in previous statistical studies of individual PCA events (Collins et al., 1961; Besprozvannaya, 1962). This tendency is attributed to that in the occurrence frequency of major solar flares producing cosmic radiations. On the recurrence table (C), I_P is found of little recurrence. Fig. 6-(c) also shows only some sporadic and short-durated enhancements of autocorrelation coefficient of I_P. Though flare-active regions themselves are fixed on the solar disk,

eruptions responsible for the PCA occur intermittently and sporadiacally. Thus no recurrency is expected for the majcr PCA events observed during solar active periods. Recurrence tendency of slight PCA events discovered by Gregory and Newdick (1964) will be discussed in a later publication using a lower threshold value of Δ fmin.

4. Conclusions

The polar cap blackout index I_P and the auroral zone blackout index I_A are proposed. The indices are computed for years 1957 - 65, and tabulated in the Appendix. The index I_P indicates the degree of PCA activity which is caused by solar cosmic rays' invasions into the polar cap, while the I_A shows day-to-day activity of auroral zone absorptions.

Solar activity control on the polar blackout and geomagnetic activities is examined using the I_P, I_A and ΣKp indices. Each index shows different kinds of secular variations. Annual mean of I_P index changes in parallel with that of Zürich sunspot numbers. This tendency is attributed to the occurrence frequency of solar flares producing sub-relativistic protons. Little recurrency was found in I_P index. On the other hand, the I_A index showed a clear recurrency of 27 days throught the half solar cycle examined, suggesting that production of energetic electrons responsible for the AZA is strongly controled by solar wind activity. The geomagnetic Kp index showed a secular variation that suggested a solar cycle control on the solar wind velocity.

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Figure Captions

Fig. 1 Synoptic patterns of SID, PCBO, and various AZBO in the northern hemisphere. The mark ⊙ shows the position of the sun.

Fig. 2 Relations between polar blackout indices, I_P and I_A, and daily sum of Kp indices, ΣKp.

Fig. 3 Time variation in I_P's in the period of March 19 through June 7. Outstanding solar flares observed during the same period are shown by the mark ▼.

Fig. 4 Secular variations in annual means of Zürich sunspot numbers, daily sum of Kp index, and blackout indices, I_P and I_A, for years 1957 - 65.

Fig. 5 Occurrence frequencies of two kinds of geomagnetic storms per year, observed at Kakioka in 1924 - 65.

Fig. 6 Time variations in mean autocorrelation coefficients at intervals of 27 days of Kp, I_A and I_P. The mean was taken for each 7 successive solar rotation numbers.

Fig. 7-A Recurrence table of geomagnetic ΣKp indices for years 1957-65.

Fig. 7-B Recurrence table of I_A index for years 1957 - 65.

Fig. 7-C Recurrence table of I_P index for years 1957 - 65.

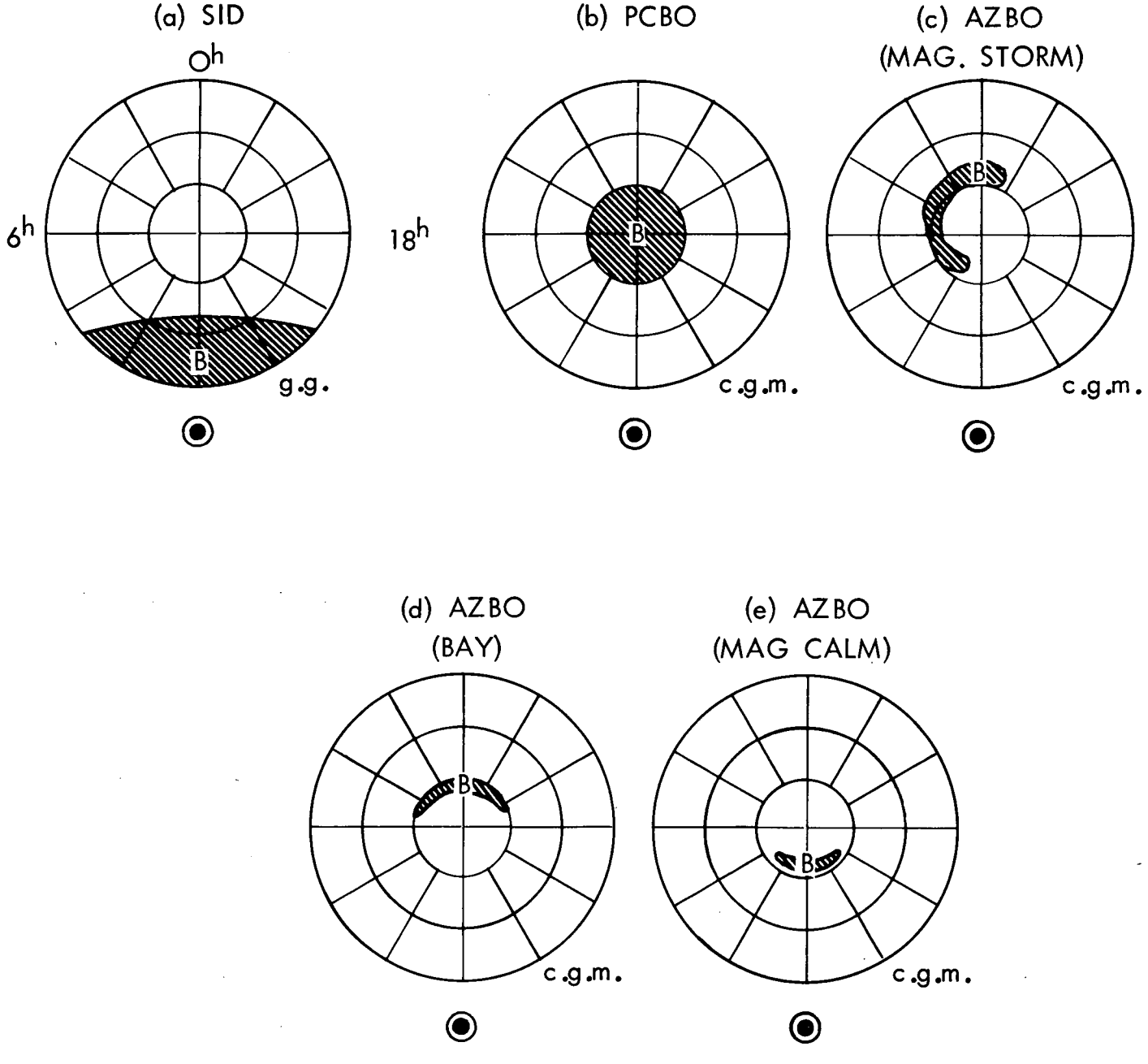


Figure 1 Synoptic patterns of blackout area during SID, PCBO, and various AZBO

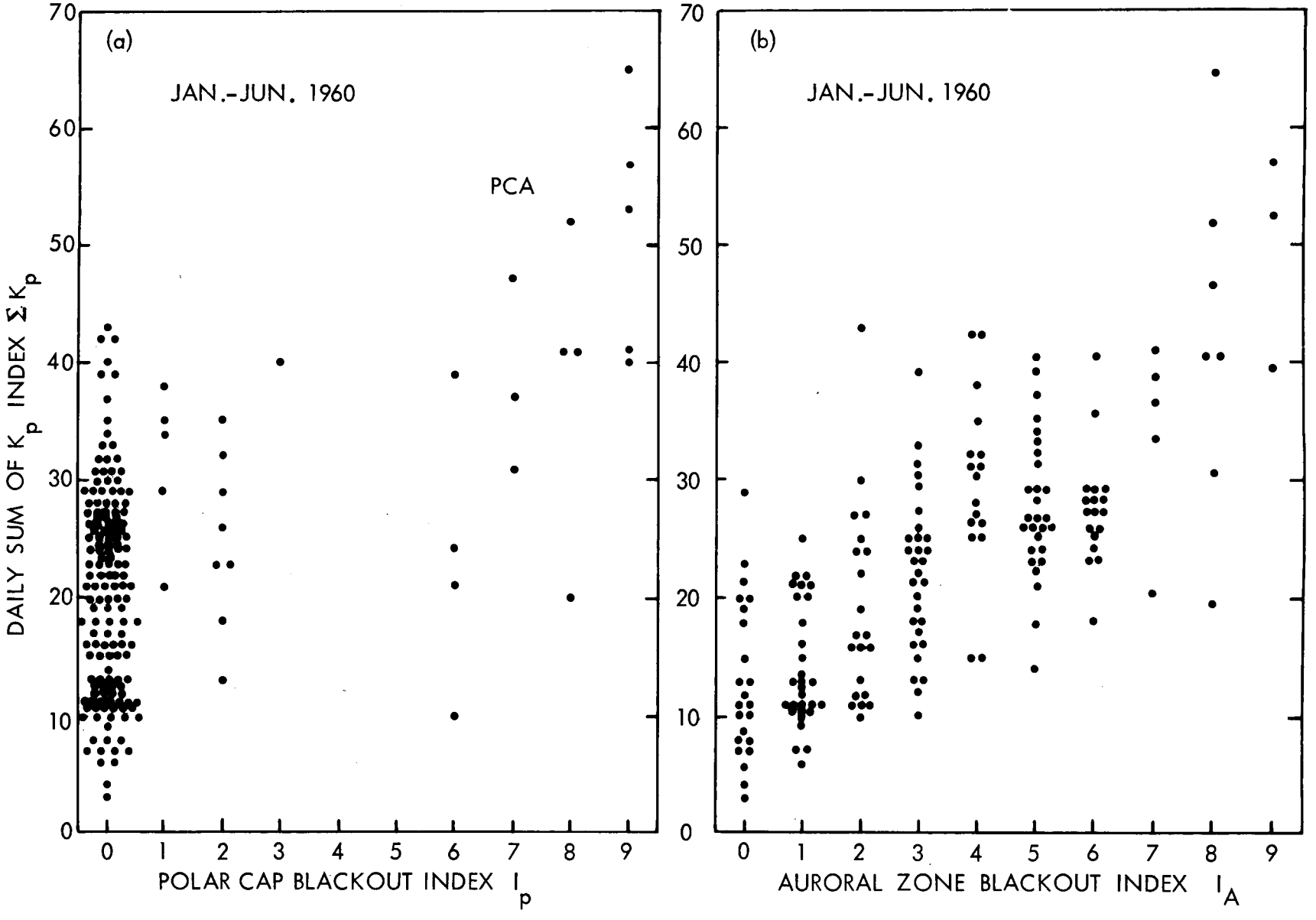
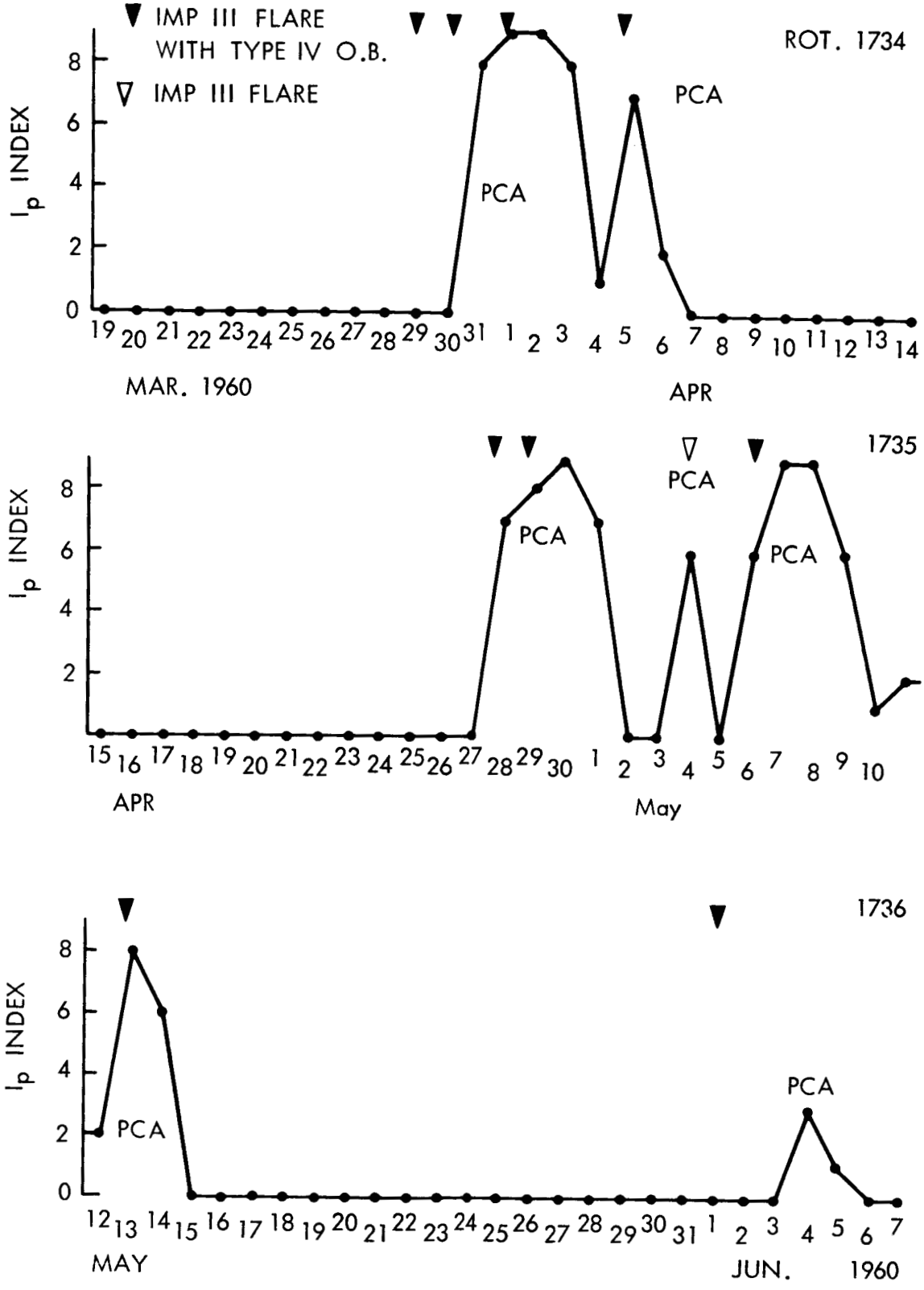


Figure 2 Relations between polar blackout indices (I_p and I_A) and daily sum of K_p indices (ΣK_p).



Variation in I_p for rotation numbers 1734-36.

Figure 3

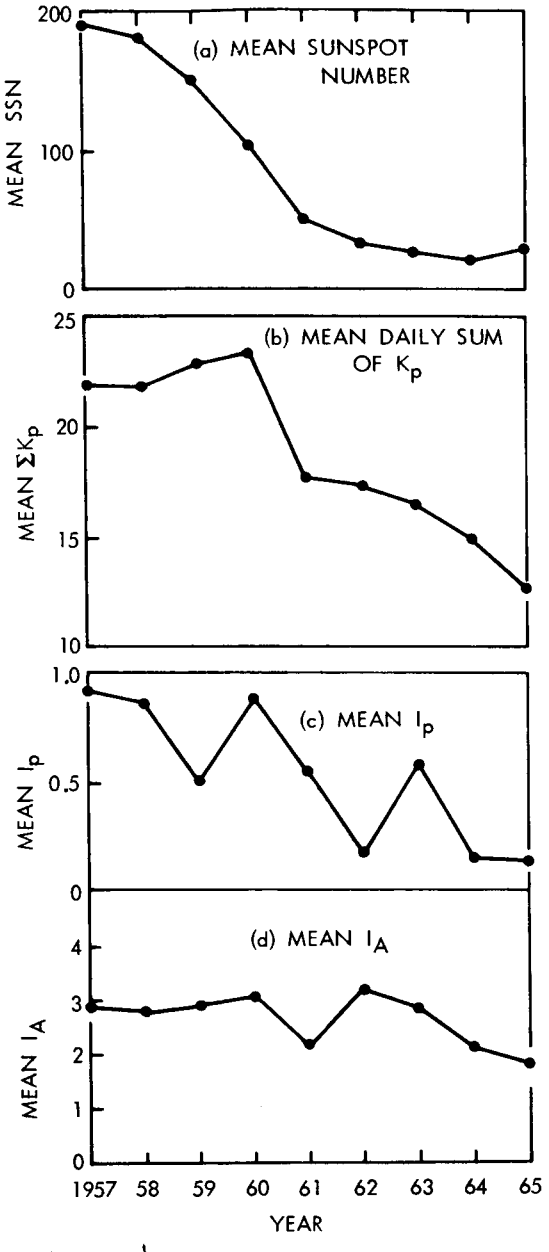


Figure 4 Secular variations in annual means of Zürich sunspot number, daily sum of K_p index, and blackout indices I_p and I_A, for years 1957-65.

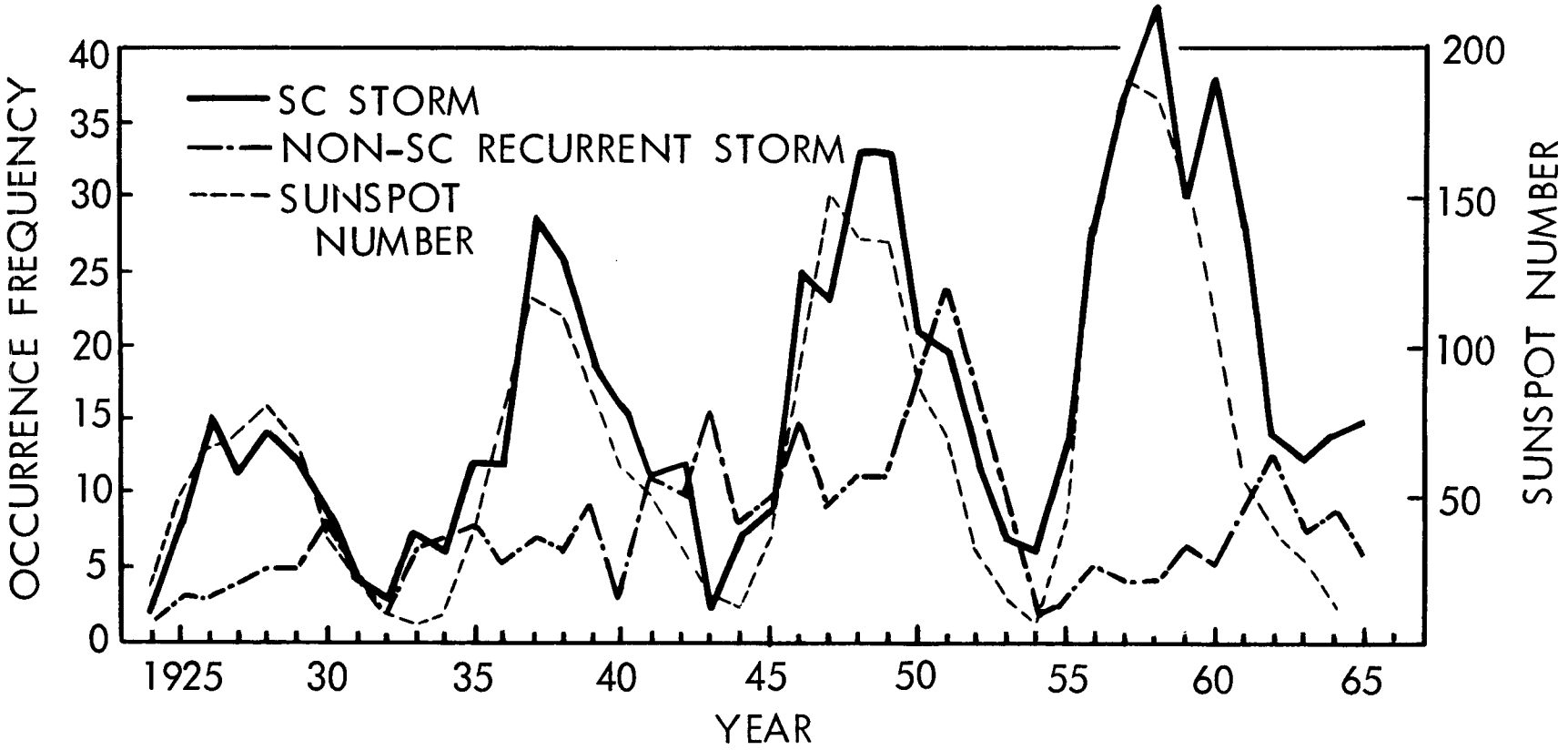


Figure 5 Occurrence frequencies of two kinds of geomagnetic storms per year, observed at Kakioka in 1924–1965

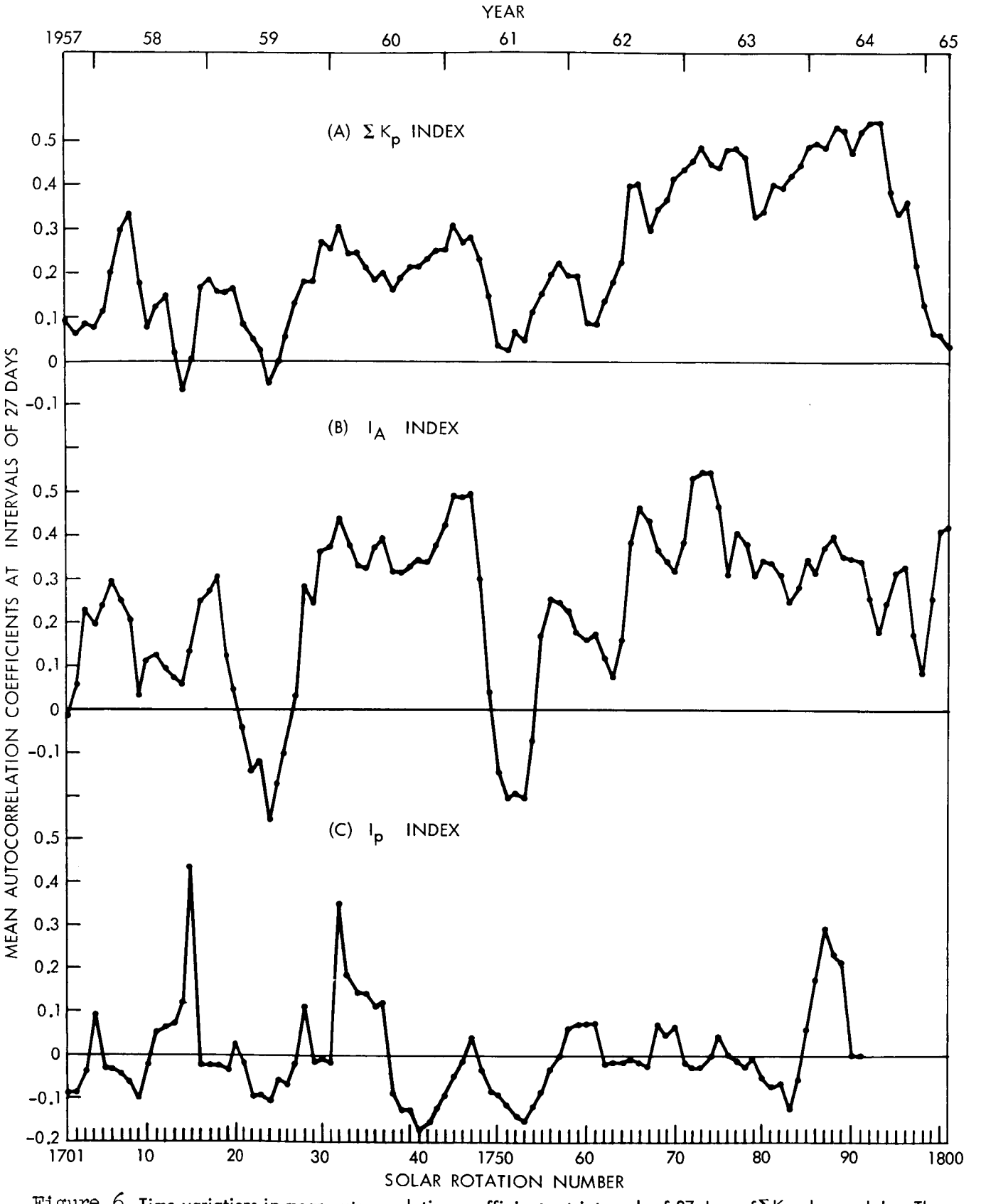


Figure 6 Time variations in mean autocorrelation coefficients at intervals of 27 days of ΣK_p, I_A, and I_p. The mean was taken for each 7 successive solar rotation periods.

Figure 7-A

(A) GEOMAGNETIC K_p INDEX

Σ_p = 0~6 | 7~13 | 14~20 | 21~27 | 28~33 | 34~

RECURRENCE TABLE

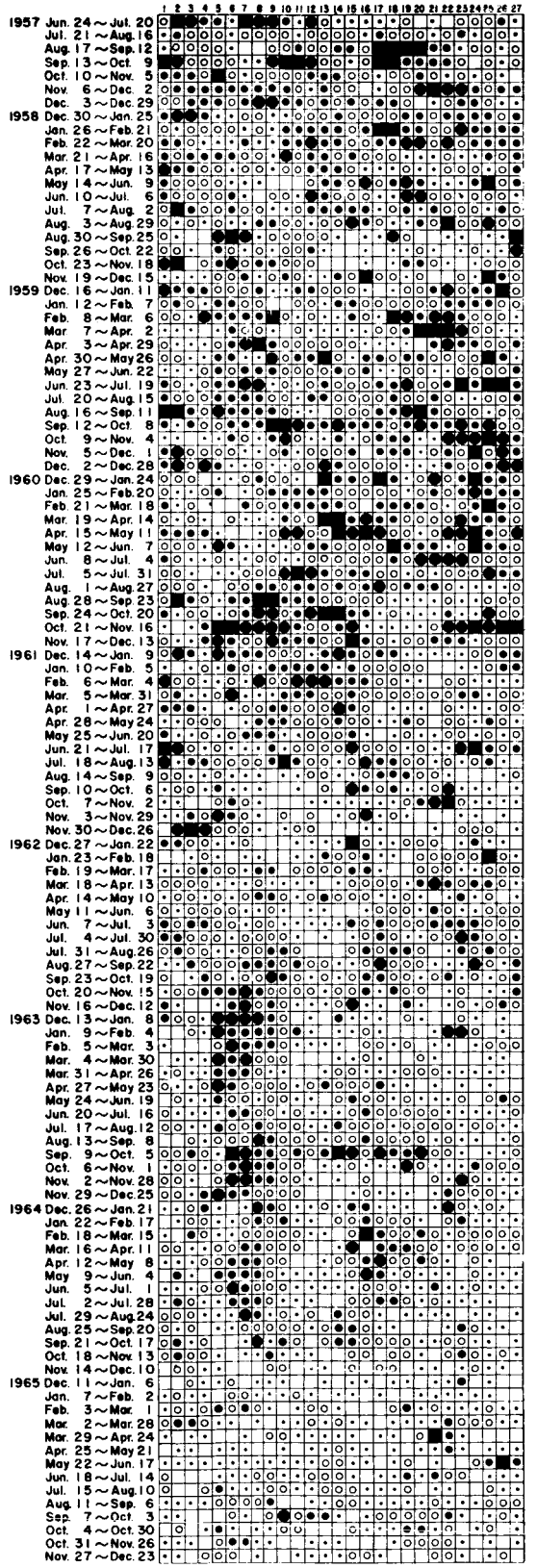


Figure 7-B

(B) BLACKOUT INDEX : I_A

I_A = 01 23 45 67 89

RECURRENCE TABLE

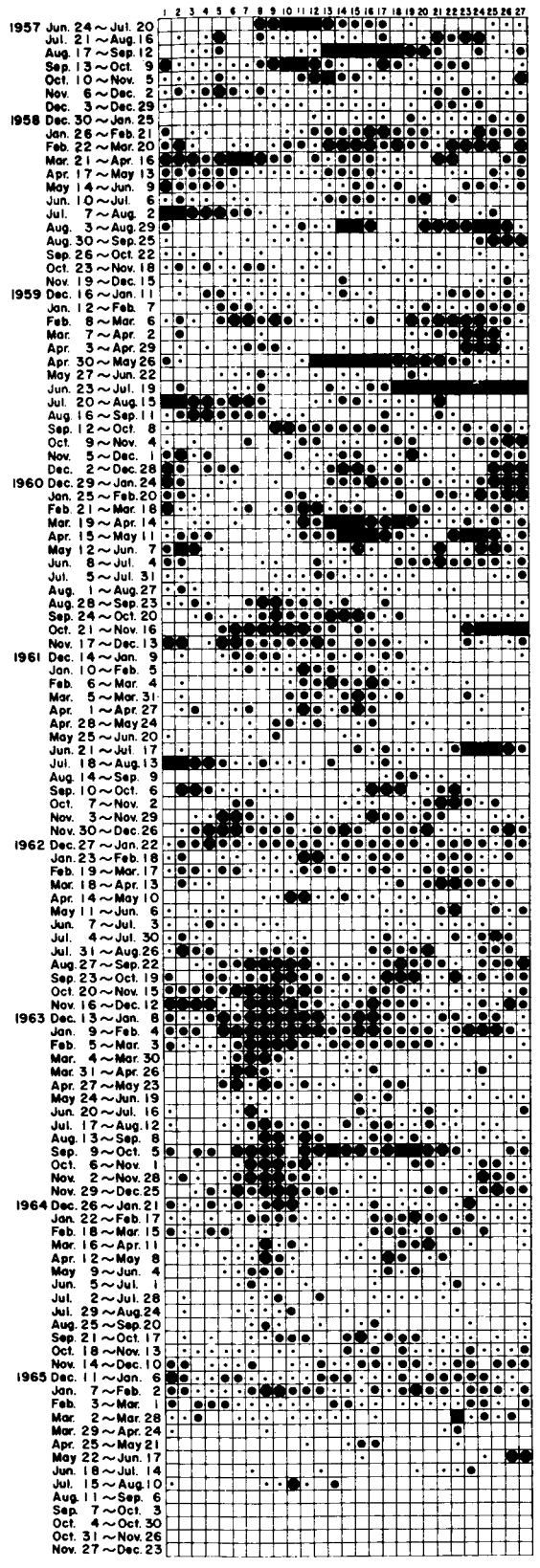
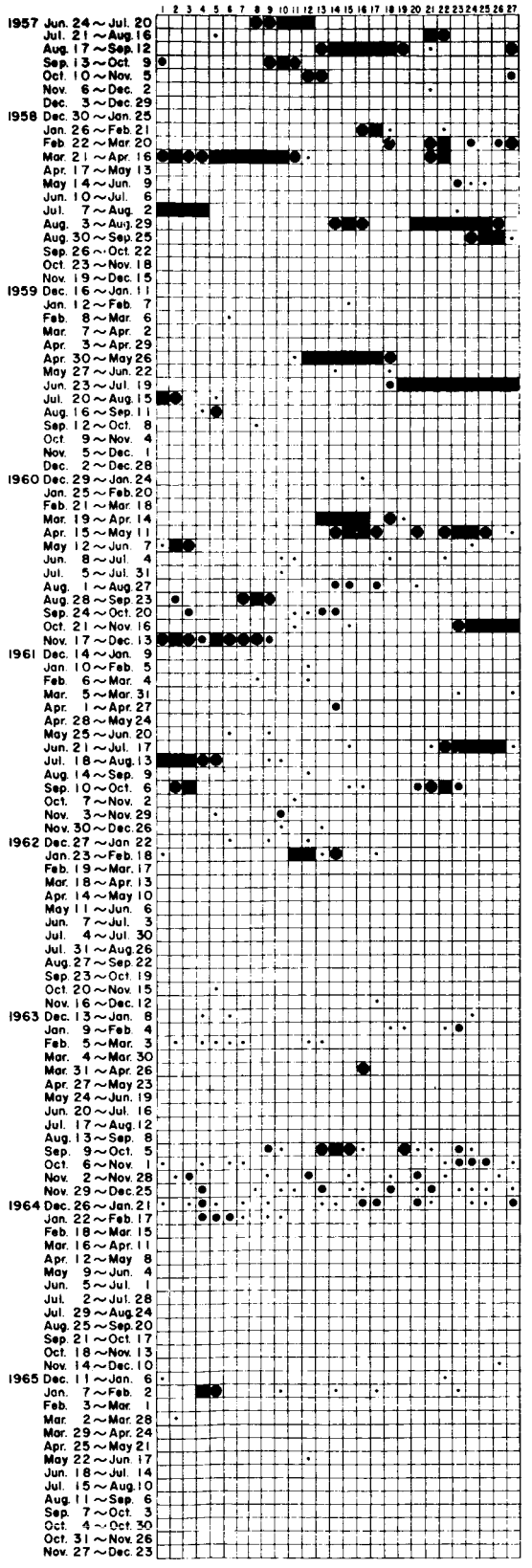


Figure 7-C

(C) BLACKOUT INDEX : I_p

I_p = 01 23 45 67 89

RECURRENCE TABLE



Appendix

Ionospheric Polar Blackout Indices I_P and I_A, and Daily Sum of Kp Index for Years 1957 - 65.

1957

DATE	JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	6	7	43	0	2	14	9	8	28	0	2	27	0	1	16	0	2	31
2	7	7	32	0	0	17	8	8	49	0	1	20	0	0	15	0	2	25
3	8	8	30	0	2	26	9	8	54	0	5	25	0	3	21	0	3	22
4	9	9	15	0	2	15	7	7	47	0	4	22	0	1	8	0	1	17
5	8	8	38	0	1	15	0	6	49	0	4	19	5	6	7	0	1	31
6	0	7	24	0	5	33	3	5	34	0	1	4	0	2	19	0	2	32
7	0	5	17	0	1	15	0	0	20	0	0	12	0	5	28	0	2	27
8	0	4	17	0	0	15	0	0	14	0	0	5	0	3	25	0	0	20
9	0	4	12	0	3	23	0	4	21	0	2	15	0	5	33	0	1	27
10	0	4	9	8	7	14	0	1	15	0	2	26	0	6	31	0	2	29
11	0	0	9	6	5	9	0	3	13	0	2	27	0	4	28	0	2	37
12	0	2	17	0	6	27	6	4	15	0	3	22	0	3	25	0	3	33
13	0	0	6	0	6	33	5	7	54	0	2	29	0	4	20	0	2	26
14	0	0	11	0	2	15	1	2	34	0	5	40	0	2	29	0	0	16
15	0	1	9	0	0	16	0	3	22	0	3	20	0	3	28	0	3	27
16	0	1	23	0	0	11	0	3	18	0	2	7	0	1	19	0	3	22
17	0	1	16	0	1	7	0	3	20	0	0	14	0	3	12	0	2	27
18	0	3	21	0	0	14	0	2	20	0	0	12	0	3	30	0	3	20
19	0	3	30	0	3	18	0	2	9	0	1	16	0	1	18	0	3	27
20	0	3	19	0	3	18	0	5	13	0	5	19	0	3	19	0	0	27
21	0	1	12	0	5	23	6	7	39	7	7	27	0	1	8	0	2	22
22	0	3	29	0	1	8	8	8	49	7	8	27	0	1	12	0	0	9
23	0	1	15	0	1	4	7	8	58	0	5	25	0	1	14	0	4	8
24	0	3	20	0	1	5	0	6	33	0	5	17	0	0	21	0	5	13
25	2	6	13	0	0	13	0	4	23	0	3	16	0	3	33	0	2	24
26	0	0	7	0	1	15	0	2	16	0	3	16	2	4	43	0	4	26
27	0	1	12	0	3	27	0	1	9	0	0	20	0	1	37	0	1	14
28	1	4	12	0	3	19	0	3	16	0	2	21	0	5	32	0	0	8
29	0	3	20	7	8	22	0	6	52	0	1	26	0	3	24	0	0	11
30	0	2	12	9	8	32	0	4	42	0	3	23	0	0	19	0	0	23
31	0	1	14	8	8	30				0	2	14				0	0	41
MEAN	1.3	3.3	18.2	1.2	2.8	17.8	2.3	4.3	29.5	0.5	2.7	19.8	0.2	2.6	22.5	0	1.8	23.3

1958

DATE	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	0	1	38	0	0	17	0	0	12	3	4	27	0	5	28	0	1	39
2	0	0	27	0	1	16	0	3	12	1	3	34	0	5	18	0	3	29
3	0	0	8	0	0	13	0	4	25	0	4	26	0	2	14	0	0	12
4	0	0	6	0	2	22	0	5	32	0	5	34	0	2	16	0	1	11
5	0	0	13	0	3	33	0	3	35	0	5	30	0	3	19	5	4	14
6	0	0	15	0	5	33	0	6	35	0	2	29	0	1	15	3	5	20
7	0	0	13	0	5	31	0	6	31	0	2	26	0	0	12	3	5	42
8	0	0	11	0	5	32	0	6	28	0	1	18	0	2	19	0	2	19
9	0	1	20	0	5	26	0	6	27	0	1	16	0	2	18	0	5	32
10	0	0	17	6	7	28	0	4	26	7	7	10	0	1	27	0	2	33
11	0	2	21	8	7	60	7	6	27	9	6	14	0	4	16	0	4	27
12	0	0	23	2	5	42	0	4	41	1	1	11	0	3	19	0	3	23
13	0	2	24	0	5	26	0	5	39	0	0	12	0	5	31	0	3	17
14	0	2	22	0	4	28	6	2	22	0	0	26	0	6	36	0	1	18
15	0	2	24	0	3	16	9	6	28	0	5	29	0	5	31	0	3	24
16	0	1	22	0	3	21	0	6	23	0	5	34	0	5	24	0	2	18
17	0	4	29	2	2	34	4	6	30	0	5	41	0	5	25	0	0	9
18	0	3	32	0	6	34	1	6	33	0	5	39	0	5	26	0	1	13
19	0	2	21	0	5	30	4	5	38	0	5	30	0	3	19	0	0	16
20	0	2	25	0	4	31	6	6	36	0	5	24	0	1	10	0	0	13
21	0	2	30	0	4	33	7	6	34	0	5	22	0	0	12	0	2	43
22	0	3	26	0	4	31	8	6	25	0	4	13	0	1	10	0	5	35
23	0	4	29	0	6	28	7	7	27	0	2	13	0	0	8	0	5	22
24	0	2	18	0	3	16	7	5	31	0	2	23	0	0	4	0	4	26
25	0	4	25	0	0	11	8	7	33	0	2	17	0	1	14	0	5	24
26	0	4	22	0	1	14	9	8	30	0	2	17	0	3	34	0	2	17
27	0	1	15	0	2	16	9	8	24	0	2	17	0	3	29	0	2	15
28	0	2	14	0	3	23	9	7	23	0	3	30	0	5	25	0	5	36
29	0	2	22				8	4	18	0	4	33	0	5	40	0	6	48
30	0	0	17				8	4	30	0	5	33	0	3	20	0	3	17
31	0	0	17				7	0	26				0	4	38			
MEAN	0	1.5	20.8	0.6	3.6	26.6	4.0	5.1	28.4	0.7	3.6	24.3	0	2.9	21.2	0.4	2.8	23.7

1958

DATE	JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	0	5	23	0	1	22	0	1	10	0	1	22	0	0	15	0	0	4
2	0	3	14	0	1	21	0	0	10	0	1	17	0	2	20	0	4	26
3	0	3	23	0	5	18	0	1	39	0	2	25	0	2	20	0	0	12
4	0	2	28	0	1	9	0	1	49	0	0	10	0	3	17	0	3	40
5	0	2	20	0	0	10	0	2	40	0	1	22	0	1	5	0	1	25
6	0	1	11	0	0	10	0	0	14	0	1	20	0	0	6	0	3	19
7	8	8	23	0	1	19	0	3	24	0	3	23	0	1	13	0	2	12
8	9	8	55	0	0	9	0	2	25	0	2	16	0	2	6	0	3	15
9	9	7	45	0	0	14	0	2	30	0	0	10	0	0	8	0	1	18
10	9	6	24	0	0	24	0	1	21	0	0	8	0	2	20	0	1	7
11	1	6	23	0	3	23	0	1	15	0	0	12	0	0	21	0	0	16
12	0	4	28	0	2	19	0	1	10	0	0	6	0	2	17	0	2	12
13	0	4	23	0	5	19	0	0	6	0	0	14	0	1	12	0	3	39
14	0	3	22	0	2	12	0	1	9	0	0	14	0	1	6	0	5	26
15	0	1	13	0	2	18	0	0	12	0	0	19	0	1	11	0	2	18
16	0	2	14	7	8	20	0	3	37	0	2	15	0	2	17	0	1	23
17	0	1	21	9	9	41	0	0	20	0	1	17	0	2	17	0	3	25
18	0	1	34	6	7	25	0	1	8	0	1	15	0	1	16	0	1	27
19	0	1	28	0	1	20	0	0	8	0	3	17	0	1	11	0	5	27
20	0	2	28	0	0	12	0	0	9	0	1	12	0	2	8	0	5	24
21	0	3	34	1	1	13	0	0	8	0	0	13	0	1	7	0	3	16
22	0	2	26	8	6	31	6	4	7	0	3	36	0	0	6	0	3	17
23	0	0	13	8	7	22	8	7	10	0	3	39	0	0	12	0	3	20
24	0	0	24	9	7	44	8	7	12	0	5	49	0	3	15	0	3	15
25	0	1	29	8	7	24	2	7	47	0	3	16	0	2	17	0	2	9
26	0	3	19	9	8	23	0	3	29	0	4	19	0	2	17	0	3	21
27	0	1	31	9	9	42	0	3	19	0	2	29	0	2	18	0	1	21
28	0	1	17	6	7	21	0	3	15	0	3	35	0	0	26	0	3	23
29	3	1	16	0	3	20	0	0	10	0	5	26	0	2	19	0	4	18
30	0	2	20	0	2	18	0	2	23	0	5	27	0	0	3	0	3	21
31	0	5	21	0	1	14				0	2	21				0	2	14
MEAN	1.3	2.9	24.2	2.6	3.4	20.5	0.8	1.9	19.2	0	1.7	20.1	0	1.3	13.5	0	2.5	19.7

1959

DATE	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	0	1	2	0	2	20	0	7	38	0	3	15	0	3	17	0	2	15
2	0	0	7	0	3	29	0	6	34	0	0	13	0	1	14	0	3	27
3	0	0	14	0	2	28	0	6	30	0	1	20	0	1	12	0	5	24
4	0	1	14	0	4	35	0	5	23	0	2	13	0	0	23	0	2	28
5	0	2	26	0	5	30	0	5	21	0	1	13	1	0	26	0	2	23
6	0	4	30	0	5	26	0	3	11	0	2	13	0	0	6	0	1	21
7	0	4	26	0	5	19	0	1	13	0	1	16	0	0	10	0	2	17
8	0	4	26	0	3	20	0	4	16	0	2	28	1	1	33	0	1	19
9	0	3	32	0	4	27	0	0	9	0	4	35	0	0	25	2	2	27
10	0	4	39	0	2	11	0	0	5	0	5	48	2	3	23	1	2	20
11	0	2	21	0	0	33	0	0	9	0	4	29	8	8	29	1	1	24
12	0	1	21	0	4	29	0	1	26	0	2	18	9	8	51	0	1	12
13	0	1	17	1	6	27	0	1	21	0	0	18	9	8	22	2	0	8
14	0	1	14	2	6	31	0	2	15	0	1	20	9	8	10	1	4	16
15	0	2	15	1	5	34	0	0	13	0	1	17	9	8	32	0	3	15
16	0	5	23	0	6	42	0	0	8	0	2	13	9	8	31	0	1	14
17	0	4	26	0	4	25	0	0	12	0	1	14	7	7	21	0	1	10
18	0	5	27	0	2	9	0	0	12	0	0	10	0	6	29	0	1	17
19	0	3	19	0	3	21	0	0	12	0	0	9	0	6	23	0	1	15
20	0	2	8	0	0	8	0	0	11	0	0	10	0	6	19	0	1	15
21	0	2	6	0	0	13	0	0	12	0	2	16	0	5	22	0	0	15
22	0	1	14	0	3	25	0	0	10	0	0	5	0	4	24	0	1	20
23	0	2	15	0	4	20	0	0	19	0	0	27	0	3	21	0	0	22
24	0	0	8	0	0	8	0	0	16	0	1	31	1	3	39	0	4	25
25	0	1	22	0	3	43	0	3	31	0	6	28	0	3	27	0	0	13
26	3	0	22	0	6	40	0	3	41	0	6	26	0	1	14	0	1	21
27	0	2	17	0	5	32	0	5	61	0	6	22	0	1	10	0	1	27
28	0	1	18	0	6	38	0	5	46	0	3	20	0	0	6	0	3	34
29	0	3	24				0	6	45	0	3	29	0	0	5	0	2	39
30	0	2	19				0	6	25	0	4	25	0	0	11	0	5	35
31	0	4	21				0	6	26				1	2	27			
MEAN	0.1	2.2	18.3	0.1	3.5	25.8	0	2.4	21.4	0	2.1	20.0	2.1	3.4	21.4	0.2	1.7	20.6

1959

DATE	JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	0	1	10	0	3	28	0	4	27	0	2	38	0	4	37	0	5	31
2	0	1	20	0	5	23	0	3	34	0	3	26	0	5	45	0	7	33
3	0	0	10	0	5	26	0	3	30	0	3	33	0	6	40	0	4	40
4	0	1	20	0	3	25	0	1	51	0	5	38	0	6	34	0	1	21
5	0	5	24	0	3	17	0	4	34	0	3	34	0	5	31	0	4	36
6	0	2	19	0	3	27	0	2	22	0	5	41	0	6	29	0	4	24
7	0	3	23	0	3	23	0	0	14	0	5	23	0	3	18	0	4	12
8	0	5	23	0	1	22	0	0	19	0	2	15	0	4	21	0	0	14
9	0	5	25	0	6	28	0	0	12	0	2	12	0	1	15	0	0	16
10	4	8	20	0	1	22	0	0	14	0	0	9	0	0	19	0	0	12
11	8	9	34	0	1	16	0	0	24	0	2	5	0	0	11	0	0	12
12	8	9	25	0	0	11	0	2	22	0	1	12	0	0	14	0	3	24
13	9	9	19	0	1	13	0	1	18	0	0	8	0	0	21	0	3	23
14	9	9	24	0	1	13	0	1	26	0	0	21	0	5	32	0	5	37
15	9	9	61	0	1	28	0	1	25	0	4	24	0	1	9	0	6	31
16	9	9	36	0	2	53	0	3	23	0	1	8	0	2	15	0	7	25
17	9	9	43	0	5	52	0	1	27	0	1	24	0	3	17	0	4	15
18	9	9	52	0	6	31	0	1	31	0	3	36	0	4	21	0	2	18
19	9	9	33	2	6	27	2	3	32	0	5	23	0	4	19	0	4	22
20	9	9	26	6	4	34	0	6	43	0	4	13	0	0	8	0	1	14
21	6	8	25	0	5	35	0	6	48	0	0	11	0	2	23	0	1	8
22	0	7	22	0	5	31	0	4	44	0	3	27	0	2	26	0	1	11
23	0	6	21	0	4	32	0	5	29	0	3	15	0	6	35	0	3	29
24	2	5	30	0	3	26	0	4	29	0	0	12	0	3	15	0	1	22
25	0	6	36	0	2	23	0	4	36	0	3	28	0	1	18	0	1	17
26	0	6	35	0	2	15	0	5	29	0	5	31	0	2	21	0	6	31
27	0	4	30	0	0	9	0	5	28	0	4	19	0	1	22	0	7	36
28	0	1	22	0	0	6	0	4	26	0	0	7	0	2	44	0	6	37
29	0	1	18	0	0	21	0	0	17	0	1	10	0	5	23	0	6	25
30	0	1	7	0	1	18	0	2	21	0	1	30	0	5	36	0	5	22
31	0	3	23	0	1	19				0	4	36				0	1	14
MEAN	3.2	5.5	26.3	0.3	2.7	24.3	0.1	2.5	27.8	0	2.4	21.6	0	2.9	24.0	0	3.3	23.0

1960

DATE	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	0	1	7	0	0	15	0	4	27	9	8	65	7	7	37	0	6	28
2	0	2	10	0	0	21	0	6	29	9	9	40	0	5	24	0	0	11
3	0	3	13	0	4	26	0	6	28	8	7	41	0	3	16	0	3	13
4	0	0	18	0	5	26	0	3	24	1	6	29	6	3	10	3	6	40
5	0	0	29	0	2	24	0	5	23	7	8	31	0	1	18	1	7	34
6	0	2	17	0	3	24	0	5	21	2	6	23	6	7	39	0	5	29
7	0	1	13	0	0	10	0	1	7	0	3	25	9	8	41	0	3	23
8	0	0	11	0	3	16	0	3	21	0	3	24	9	9	53	0	4	30
9	0	0	8	0	1	11	0	0	20	0	3	20	6	6	24	0	5	26
10	0	5	35	0	1	11	0	4	26	0	4	32	1	3	21	0	1	13
11	0	5	31	0	5	14	0	5	34	0	2	30	2	4	35	0	0	10
12	0	5	24	0	1	12	0	3	17	0	5	33	2	5	26	0	1	11
13	2	6	18	0	1	15	0	3	12	0	3	30	8	8	20	0	0	13
14	0	5	37	0	4	32	0	3	15	0	5	23	6	7	21	0	1	21
15	0	5	29	0	4	15	0	2	22	0	2	27	0	1	16	0	2	19
16	0	2	11	0	3	29	0	5	39	0	4	31	0	3	31	0	2	11
17	0	5	22	0	6	29	0	5	28	0	5	32	0	1	21	2	1	13
18	0	3	27	0	4	31	0	3	19	0	5	26	0	1	12	2	0	23
19	0	2	16	0	6	27	0	2	17	0	1	9	0	1	11	0	4	25
20	0	3	25	0	6	25	0	0	8	0	0	4	0	0	7	0	2	16
21	0	5	40	0	6	28	0	2	12	0	0	6	0	1	11	0	3	25
22	0	6	27	0	3	18	0	2	11	0	0	11	0	1	10	0	1	21
23	0	6	26	0	3	18	0	1	10	0	0	19	0	1	25	0	1	20
24	0	6	26	0	0	7	0	2	24	0	2	43	0	3	33	0	1	22
25	0	5	18	0	0	8	0	0	13	0	4	42	0	2	27	2	5	29
26	0	4	15	0	2	11	0	1	13	0	5	26	0	6	27	0	5	27
27	0	2	16	0	4	28	0	1	11	0	4	25	0	3	22	0	4	42
28	0	2	13	0	1	13	0	3	23	7	8	47	0	1	20	1	6	35
29	0	0	20	0	2	25	0	6	23	8	8	41	0	2	39	2	5	32
30	0	0	3				0	5	26	9	9	57	0	3	25	1	4	38
31	0	1	6				8	8	52				0	1	22			
MEAN	0.1	3.0	19.7	0	2.9	19.6	0.3	3.2	21.1	2.0	4.3	29.7	2.0	3.5	24.0	0.5	2.9	23.3

1960

DATE	JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	0	4	30	0	3	22	0	1	5	0	5	40	0	5	21	1	5	49
2	0	4	23	0	5	25	0	1	23	0	6	39	0	4	24	1	5	31
3	0	3	22	0	3	15	7	5	31	0	5	22	0	1	25	0	4	15
4	0	4	28	0	1	13	8	7	48	2	5	28	2	5	41	0	3	12
5	0	2	25	0	0	6	7	7	52	2	4	33	0	2	16	0	1	18
6	0	2	20	0	0	14	1	5	29	5	6	63	0	1	12	0	3	26
7	0	0	10	0	0	14	0	5	30	5	7	59	0	0	11	0	1	27
8	0	0	6	0	2	23	0	5	25	0	6	34	0	0	7	2	1	25
9	0	0	8	0	3	27	0	3	24	0	5	36	0	0	11	0	5	27
10	0	0	17	0	2	22	0	4	22	0	2	16	0	0	12	0	3	18
11	0	1	19	0	2	29	0	1	22	0	4	24	1	1	25	0	1	17
12	0	1	19	0	3	28	0	1	19	0	1	11	6	7	33	1	2	25
13	0	2	22	0	0	16	0	4	26	0	1	8	9	9	67	0	5	20
14	2	2	33	5	1	21	0	1	17	0	0	5	9	9	37	0	1	12
15	1	2	45	5	1	16	0	0	9	0	3	24	9	9	42	0	3	36
16	0	4	44	0	2	30	0	0	7	0	2	12	9	9	45	1	1	30
17	0	5	28	4	3	51	0	0	14	0	3	14	7	7	26	0	0	14
18	0	2	22	0	3	22	0	1	21	0	3	31	8	6	9	0	3	30
19	0	3	32	0	1	25	0	0	8	0	2	19	6	0	11	0	4	26
20	0	2	30	2	0	28	0	0	9	0	2	18	5	3	18	0	4	29
21	0	3	18	0	2	32	0	1	16	0	1	14	8	7	36	0	4	29
22	1	3	19	0	2	21	0	1	18	0	0	4	7	7	31	0	4	27
23	0	2	14	0	0	15	0	2	21	0	0	6	7	5	18	0	3	23
24	0	0	19	0	0	12	0	1	29	0	1	20	6	4	22	0	3	23
25	0	0	7	0	0	6	0	1	9	1	5	42	4	5	37	0	3	16
26	0	0	15	0	0	7	4	3	17	0	6	43	0	4	25	0	4	23
27	0	0	12	0	1	24	1	5	22	1	6	36	0	5	28	0	3	38
28	0	1	12	0	2	19	0	2	13	1	6	38	0	6	25	0	4	28
29	0	3	32	5	2	37	0	2	20	0	7	37	0	4	17	0	3	26
30	0	2	31	0	5	38	0	3	32	0	7	35	0	1	21	0	4	25
31	0	5	35	0	3	23				2	7	32				0	5	24
MEAN	0.1	2.0	22.5	0.7	1.7	22.0	0.9	2.4	21.3	0.6	3.8	27.2	3.3	4.2	25.1	0.2	3.1	24.8

1961

DATE	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	1	0	13	0	0	6	0	0	15	0	1	24	0	2	22	0	1	31
2	0	0	8	0	0	2	0	0	14	0	3	23	0	2	20	2	4	30
3	0	1	10	0	0	18	0	0	9	0	4	29	0	0	7	0	1	17
4	0	0	6	0	1	30	0	0	5	0	1	10	0	2	12	0	1	15
5	0	0	8	0	1	26	0	0	16	0	0	10	0	2	26	0	1	17
6	0	0	12	0	1	28	0	2	28	0	3	14	0	4	31	0	1	22
7	0	0	16	0	2	20	0	0	7	0	4	13	0	5	27	0	2	29
8	0	1	29	0	1	18	0	0	10	0	0	12	0	2	20	0	2	25
9	0	3	33	0	0	14	0	0	21	0	1	26	0	4	22	0	0	13
10	0	1	10	0	0	7	0	0	33	0	2	27	0	0	15	0	0	8
11	0	0	2	0	0	15	0	0	12	0	6	29	0	1	27	0	0	4
12	0	1	11	0	0	4	0	1	12	0	5	19	0	2	24	0	1	14
13	0	0	17	3	1	26	0	0	18	1	2	21	0	4	26	0	0	6
14	0	0	9	0	0	14	0	5	31	5	4	36	0	1	17	0	0	7
15	0	2	23	0	2	13	0	4	28	0	6	38	0	1	8	0	0	20
16	0	4	18	1	4	30	0	5	24	0	5	22	0	3	31	0	1	18
17	0	3	16	2	4	28	0	3	20	0	1	9	0	2	15	0	0	12
18	0	3	24	1	7	38	1	5	18	0	0	11	0	0	5	0	0	22
19	1	3	27	1	5	26	1	6	34	0	1	15	0	0	17	0	0	14
20	0	6	35	0	5	33	0	5	25	0	1	13	0	3	21	1	1	18
21	3	5	24	0	6	29	0	3	18	0	0	5	0	1	11	0	0	42
22	1	4	27	0	5	26	0	5	19	0	1	14	0	0	19	0	2	42
23	0	1	13	0	3	20	0	3	18	0	1	16	0	0	22	0	0	16
24	0	3	26	0	2	14	0	1	16	0	3	20	0	1	15	1	1	12
25	0	5	25	0	1	7	0	1	9	0	1	14	0	2	33	1	1	17
26	0	2	21	0	0	7	0	1	17	1	1	21	0	0	13	0	1	11
27	0	0	16	0	1	15	2	4	24	0	2	21	0	0	12	0	0	13
28	0	3	20	0	2	21	0	3	24	1	1	14	0	1	17	0	0	9
29	0	3	18				0	0	12	0	1	10	0	1	9	0	0	26
30	0	0	8				0	1	16	0	1	18	2	0	17	0	0	8
31	0	1	7				2	0	12				0	2	29			
MEAN	0.2	1.8	17.2	0.3	1.9	19.1	0.2	1.9	18.0	0.3	2.1	18.5	0.1	1.5	19.0	0.2	0.7	17.9

1961

DATE	JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	0	1	17	0	1	15	0	5	32	8	7	43	0	1	11	0	3	35
2	0	1	20	0	2	36	0	2	21	5	3	11	0	1	8	0	5	44
3	1	1	23	0	4	26	0	2	19	1	1	10	0	0	9	0	7	40
4	0	0	22	0	3	25	0	0	11	1	1	13	0	0	7	0	6	18
5	2	5	37	0	1	17	0	2	20	0	0	7	0	3	26	1	6	18
6	0	3	24	0	0	15	0	0	9	1	1	11	0	3	21	0	5	22
7	0	4	21	0	0	8	2	0	7	0	0	12	2	6	36	0	4	12
8	0	2	18	0	0	22	0	0	7	0	1	11	0	6	26	1	4	2
9	0	2	16	0	0	8	0	1	14	0	0	6	1	4	20	2	5	7
10	0	3	23	0	0	20	0	0	14	0	0	4	0	2	9	0	2	12
11	2	2	17	0	0	30	7	6	19	0	0	20	5	2	5	0	4	22
12	7	5	9	0	0	13	8	7	22	0	4	26	0	4	24	2	5	9
13	9	9	39	0	0	4	0	4	14	0	4	21	1	1	7	0	6	7
14	9	9	47	0	0	13	0	2	30	0	1	12	0	3	19	0	4	8
15	9	9	30	0	0	15	0	2	12	0	1	5	0	2	2	0	3	13
16	8	7	28	0	0	9	0	0	16	0	0	1	0	1	4	0	4	7
17	3	4	31	0	0	11	0	3	17	2	1	2	0	2	21	0	5	7
18	8	8	49	0	0	10	0	3	13	0	0	5	0	6	39	0	5	4
19	9	9	17	0	0	16	0	0	5	0	1	11	0	5	16	0	7	2
20	9	7	24	0	1	12	0	0	18	0	2	18	0	5	21	0	3	6
21	7	7	33	0	0	10	0	0	4	0	2	15	0	3	13	0	3	6
22	6	5	19	1	0	4	0	0	11	0	2	11	0	4	5	0	2	11
23	1	2	22	0	1	5	0	0	5	0	0	10	0	5	3	0	2	19
24	0	2	21	0	0	9	2	3	33	0	0	10	0	1	5	0	4	18
25	1	5	22	2	1	18	2	6	33	0	2	14	0	3	9	0	6	3
26	2	3	25	0	0	20	0	6	26	0	4	32	0	1	10	0	5	8
27	3	3	50	0	0	14	0	7	30	0	6	32	0	2	8	0	3	17
28	0	3	26	0	0	11	0	0	8	0	6	48	0	3	5	1	5	25
29	0	1	16	0	1	19	5	3	12	1	4	27	0	2	6	0	5	20
30	0	4	15	0	3	35	6	5	23	0	3	12	0	0	4	0	6	24
31	0	1	13	0	5	32				0	4	9				0	5	14
MEAN	3.1	4.1	25.0	0.1	0.7	16.2	1.0	2.3	16.8	0.6	2.0	15.1	0.3	2.7	13.3	0.2	4.5	14.8

1962

DATE	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	2	5	10	0	2	2	0	4	13	0	1	18	0	3	14	0	6	17
2	0	3	17	8	7	8	0	4	15	0	1	14	0	2	18	0	2	10
3	0	4	3	8	6	8	0	4	13	0	3	21	0	3	14	0	1	9
4	2	5	1	3	3	25	0	2	13	0	4	20	0	0	3	0	4	22
5	1	5	1	6	5	13	0	3	22	0	1	12	0	0	6	0	2	17
6	0	5	6	0	3	10	0	5	32	0	4	30	0	2	27	0	5	18
7	2	4	5	0	5	26	0	5	15	0	7	43	0	1	14	0	2	16
8	0	3	7	3	4	6	0	3	4	0	7	32	0	3	11	0	1	6
9	1	4	12	0	4	10	0	3	3	0	5	19	0	1	4	1	3	29
10	0	4	40	0	1	5	0	4	21	0	5	32	0	1	11	0	5	23
11	0	5	21	0	3	19	0	5	20	0	5	28	0	2	16	0	3	12
12	0	4	9	0	5	26	0	5	24	0	5	16	0	0	6	0	3	15
13	0	4	10	0	5	22	0	5	13	0	1	9	0	3	21	0	1	10
14	1	4	15	0	4	22	0	3	9	0	1	5	0	3	24	0	3	15
15	1	3	18	0	3	20	0	1	17	0	0	16	0	2	22	0	3	20
16	0	5	20	0	3	34	0	0	8	0	1	13	0	3	15	0	0	11
17	0	4	8	0	4	21	0	1	8	0	1	15	0	0	6	0	0	3
18	1	5	4	0	1	11	0	1	15	0	2	20	0	0	4	0	0	4
19	0	5	23	0	2	6	0	4	22	1	1	12	0	1	17	0	0	9
20	0	2	8	0	4	6	0	2	21	0	0	17	0	0	10	0	0	8
21	0	5	14	0	4	13	0	3	24	0	2	25	0	0	5	0	1	18
22	0	4	2	0	3	21	0	1	7	0	2	33	0	0	6	0	0	18
23	2	3	1	0	4	17	0	1	8	0	6	20	0	0	4	0	3	23
24	0	4	2	0	5	17	0	0	13	0	6	9	0	1	3	0	2	14
25	0	1	9	0	2	14	0	1	17	0	3	18	0	0	2	0	2	13
26	0	1	16	0	2	23	0	1	7	0	3	19	0	0	8	0	0	14
27	0	3	19	0	3	23	0	0	8	0	4	15	0	2	21	0	3	27
28	0	3	6	0	2	5	0	1	8	0	2	16	0	3	13	0	3	25
29	0	1	13				0	0	13	0	3	13	0	1	12	0	2	23
30	0	3	15				0	1	5	0	0	10	0	0	5	0	2	21
31	0	2	2				0	0	9				0	4	26			
MEAN	0.4	3.6	10.9	1.0	3.5	15.5	0	2.4	13.8	0.03	2.8	19.0	0	1.3	11.9	0.03	2.1	15.7

1962

DATE	JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	0	1	18	0	6	35	0	5	32	0	6	38	0	3	16	0	6	14
2	0	3	15	0	5	19	0	6	34	0	6	28	0	3	22	0	5	7
3	0	1	16	0	4	20	0	7	38	0	5	20	0	3	23	0	4	7
4	0	3	25	0	1	14	0	7	35	0	5	18	0	4	26	0	5	24
5	0	4	24	0	3	15	0	6	24	0	3	17	0	4	11	2	2	13
6	0	2	21	0	3	26	0	6	28	0	5	22	0	4	28	0	3	6
7	0	2	15	0	5	27	0	3	22	0	3	19	0	3	20	0	1	7
8	0	1	20	0	4	33	0	3	21	0	3	34	0	2	16	0	2	14
9	0	1	12	0	5	26	0	3	19	0	6	33	0	1	8	0	4	12
10	0	1	15	0	5	18	0	3	17	0	7	28	0	2	9	0	3	12
11	0	1	18	0	1	4	0	3	15	0	6	30	0	3	20	0	6	29
12	0	2	15	0	1	7	0	4	39	0	3	16	0	3	7	0	4	17
13	0	2	19	0	1	9	0	6	28	0	3	18	1	1	5	0	5	24
14	0	2	17	0	0	17	0	5	19	0	6	33	0	3	10	0	3	22
15	0	0	11	0	4	27	0	5	23	0	3	18	1	4	29	1	2	17
16	0	0	6	0	4	25	0	4	18	0	5	25	0	6	31	2	4	10
17	0	0	4	0	5	29	0	3	15	0	2	13	0	7	14	0	6	30
18	0	1	8	0	5	28	0	1	10	0	4	22	0	6	3	2	5	37
19	0	2	18	0	6	25	0	5	35	0	4	27	0	7	7	1	7	38
20	0	4	24	0	1	10	0	4	19	0	4	19	0	3	7	0	7	35
21	0	2	21	0	0	12	0	4	21	0	5	22	0	3	26	0	7	29
22	0	3	14	0	3	32	0	6	28	0	5	29	0	6	36	0	6	20
23	0	3	16	0	4	26	0	5	20	0	5	29	0	6	27	1	6	7
24	0	1	20	0	5	28	0	1	11	2	4	31	0	6	24	1	7	10
25	0	5	20	0	4	22	0	1	13	0	6	35	0	7	26	0	3	8
26	0	3	37	0	1	15	0	5	31	0	6	34	0	5	13	0	5	23
27	0	5	31	0	1	10	0	4	17	0	6	31	0	5	17	0	6	13
28	0	6	26	0	0	9	0	2	16	0	6	26	0	3	15	0	6	10
29	0	4	17	0	3	23	0	5	25	0	5	22	0	5	16	0	5	10
30	0	1	10	0	2	22	0	4	22	0	6	23	0	5	31	0	5	7
31	0	3	15	0	5	28				0	4	18				0	3	18
MEAN	0	2.2	17.7	0	3.1	20.7	0	4.2	23.2	0.1	4.7	25.1	0.1	4.1	18.1	0.4	4.6	17.1

1963

DATE	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	1	3	10	1	6	20	0	1	23	0	1	17	0	5	33	0	2	20
2	0	5	2	0	6	4	1	0	13	0	0	8	0	6	30	0	2	19
3	0	4	3	1	5	6	0	3	15	0	0	8	0	3	23	0	0	14
4	0	3	14	0	3	6	0	0	7	0	2	24	0	6	27	0	2	9
5	2	5	7	0	4	7	0	1	6	0	6	33	0	4	18	0	0	3
6	0	5	0	2	3	7	0	0	10	0	6	26	0	3	16	0	1	16
7	0	1	13	1	3	6	1	1	11	0	4	23	0	4	12	0	4	35
8	0	3	5	2	2	1	0	3	33	0	3	14	0	3	19	0	2	20
9	1	4	1	3	3	9	0	4	26	0	3	14	0	3	23	0	4	18
10	1	4	5	2	5	38	0	7	38	0	0	4	0	3	23	0	1	11
11	0	4	11	3	7	28	0	6	27	0	0	6	0	1	25	0	0	13
12	1	0	9	1	7	27	0	5	20	0	1	17	0	1	18	0	0	10
13	0	6	32	0	7	31	1	1	14	0	2	18	0	4	28	0	0	11
14	0	6	33	0	7	25	0	3	4	0	3	24	0	5	19	0	1	11
15	0	6	29	0	5	15	0	0	5	6	5	21	0	1	11	0	2	16
16	1	6	30	2	3	8	0	0	2	1	1	12	0	1	6	0	0	5
17	0	6	26	2	4	7	0	2	7	0	0	13	0	0	13	0	2	18
18	0	6	23	1	4	5	0	3	12	0	1	20	0	0	6	0	2	26
19	0	7	27	0	4	3	0	1	14	0	3	19	0	1	10	0	2	18
20	0	6	13	0	4	17	0	0	8	0	2	14	0	2	11	0	3	21
21	0	4	6	0	4	12	0	0	6	0	0	7	0	0	8	0	1	14
22	1	5	10	0	4	14	0	0	4	0	2	15	0	0	5	0	0	9
23	0	6	17	0	5	11	0	0	18	0	4	14	0	0	5	0	0	7
24	0	6	17	0	4	3	0	0	10	0	0	4	0	0	3	0	0	13
25	0	5	14	0	3	8	0	0	6	0	0	8	0	0	16	0	3	28
26	2	5	4	0	3	11	0	0	4	0	1	11	0	0	12	0	6	28
27	2	4	2	1	1	3	0	0	2	0	2	18	0	0	14	0	2	24
28	0	5	3	0	0	13	0	0	8	0	0	6	1	2	23	0	1	21
29	0	2	8				0	2	11	0	0	8	0	3	23	0	0	17
30	2	4	33				0	0	5	0	1	21	0	3	18	0	1	20
31	4	6	37				0	0	7				0	2	16			
MEAN	0.6	4.6	13.5	0.8	4.1	12.3	0.1	1.4	12.1	0.2	1.8	14.9	0.03	2.1	16.6	0	1.5	16.5

1963

DATE	JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	0	1	9	0	4	25	0	2	23	4	3	7	2	3	17	0	3	10
2	0	1	5	0	5	22	0	0	13	2	0	5	0	2	23	4	4	21
3	0	0	5	0	3	17	0	2	18	0	0	8	2	5	23	0	3	36
4	0	4	20	0	2	21	0	0	10	0	5	12	4	2	13	0	6	30
5	0	3	25	0	4	21	0	2	17	0	4	15	0	1	3	0	5	32
6	0	0	24	0	3	20	0	2	17	2	1	9		3	20	3	6	30
7	0	1	20	0	2	17	0	0	9	0	0	17		5	36	0	6	24
8	0	3	22	0	1	12	0	3	21	0	2	23		6	39	2	6	23
9	0	5	23	0	2	17	0	4	21	2	1	12		7	34	3	5	14
10	0	0	19	0	2	12	0	0	17	0	1	17	2	6	32	0	4	0
11	0	2	12	0	0	8	0	4	26	2	3	27	0	5	24	4	4	3
12	0	0	9	0	0	9	0	5	21	2	6	36	0	4	22	0	2	6
13	0	0	10	0	0	5	0	0	12	0	7	29	5	2	10	3	0	13
14	0	0	8	0	0	5	0	6	47	0	7	33	0	0	9	3	2	18
15	0	0	8	0	0	13	0	7	36	0	5	24	0	1	7	0	0	15
16	0	4	14	0	0	12	0	7	35	0	6	24	2	2	5	5	2	13
17	0	3	24	0	0	16	5	7	37	0	2	10	0	3	20	0	2	7
18	0	0	18	0	3	28	3	3	23	0	1	11	0	0	5	3	5	3
19	0	0	10	0	3	24	0	6	30	0	2	11	2	0	3	4	5	7
20	0	0	12	0	6	39	0	6	22	0	1	21	0	0	7	0	2	27
21	0	2	28	0	6	30	7	8	33	0	1	14	5	0	4	2	3	18
22	0	3	22	0	3	16	8	7	50	0	3	5	0	1	11	2	4	21
23	0	4	28	0	6	24	7	7	37	0	0	7	2	0	15	2	6	20
24	0	7	32	0	4	17	2	5	21	0	4	41	0	3	25	0	5	17
25	0	5	21	0	1	16	0	7	40	0	4	21	0	6	21	2	5	5
26	0	3	23	0	2	19		8	31	0	2	15	0	5	4	2	5	8
27	0	5	24	0	3	22	7	8	31	2	0	7	2	4	7	0	3	9
28	0	2	12	0	4	30	3	7	39	4	2	11	0	2	9	3	2	19
29	0	0	7	0	4	23	2	7	27	4	5	37	0	1	15	4	4	24
30	0	4	31	0	2	19	0	5	19	4	4	25	0	1	22	2	2	11
31	0	3	26	0	5	25				0	2	12				0	5	5
MEAN	0	2.1	17.8	0	2.6	18.8	1.5	4.5	26.1	0.9	2.7	17.6	1.1	2.7	16.2	1.7	3.7	15.8

1964

DATE	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	2	3	12	0	2	18	0	0	8	0	0	26	0	3	27	0	0	10
2	0	5	37	0	3	14	0	0	2	0	5	30	0	4	18	0	0	8
3	2	6	28	0	3	4	0	0	13	0	4	26	0	0	9	0	0	7
4	0	7	26	0	3	19	0	4	41	0	6	19	0	0	7	0	0	9
5	0	2	16	0	0	17	0	5	34	0	0	19	0	0	15	0	0	5
6	0	3	11	0	4	33	0	5	25	0	1	12	0	0	8	0	0	7
7	2	3	13	0	5	24	0	3	21	0	2	19	0	0	5	0	0	8
8	2	2	11	0	4	23	0	5	26	0	1	22	0	0	1	0	0	16
9	0	2	26	0	6	23	0	2	14	0	0	14	0	0	3	0	0	16
10	5	5	27	0	4	15	0	4	8	0	1	9	0	1	25	0	3	37
11	5	3	17	0	4	6	0	0	15	0	3	19	0	1	20	0	4	30
12	0	3	11	0	3	22	0	4	23	0	0	7	0	0	5	0	2	22
13	0	2	11	0	5	33	0	0	16	0	0	10	0	2	19	0	2	18
14	4	2	2	0	2	18	0	1	19	0	0	8	0	3	29	0	0	14
15	2	0	3	0	3	14	0	3	19	0	1	16	0	5	29	0	3	12
16	0	2	30	0	3	10	0	0	16	0	3	17	0	5	27	0	0	8
17	0	6	23	0	2	13	0	2	17	0	3	24	0	4	16	0	0	7
18	2	1	14	0	4	10	0	2	6	0	2	24	0	2	10	0	1	13
19	2	2	12	0	2	3	0	1	6	0	6	28	0	1	9	0	1	9
20	0	2	12	0	2	21	0	1	14	0	5	22	0	0	6	0	2	23
21	4	3	3	0	4	22	0	2	19	0	2	16	0	0	10	0	1	18
22	0	2	8	0	5	14	0	3	28	0	0	4	0	0	7	0	0	11
23	0	2	8	0	1	13	0	6	31	0	0	6	0	0	11	0	0	13
24	0	1	20	0	0	14	0	3	25	0	0	7	0	3	28	0	0	10
25	4	3	20	0	3	23	0	5	24	0	2	19	0	5	29	0	3	17
26	5	1	13	0	3	24	0	3	18	0	2	18	0	2	12	0	4	11
27	5	2	7	1	0	23	0	0	6	0	3	29	0	4	20	0	0	11
28	2	4	17	0	1	25	0	0	1	0	6	33	0	0	16	0	2	17
29	0	5	28	0	1	16	0	0	7	0	5	22	0	1	10	0	2	12
30	2	5	19				0	3	29	0	0	14	0	0	12	0	0	6
31	2	5	26				0	0	5				0	0	7			
MEAN	1.7	3.0	16.5	0.03	2.8	17.7	0	2.2	17.3	0	2.1	18.0	0	1.5	14.5	0	1.0	13.5

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DATE	JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	0	0	7	0	1	11	0	4	26	0	4	16	0	2	20	0	4	17
2	0	0	6	0	0	7	0	2	18	0	1	8	0	4	19	0	4	6
3	0	2	26	0	2	10	0	1	17	0	1	17	0	1	8	0	3	10
4	0	0	16	0	2	32	0	0	17	0	5	32	0	4	14	0	3	7
5	0	0	10	0	1	24	0	3	11	0	6	27	0	2	16	0	5	3
6	0	0	11	0	3	11	0	0	17	0	2	21	0	2	9	0	4	5
7	0	1	24	0	5	21	0	1	31	0	4	21	0	3	2	0	2	17
8	0	3	28	0	0	8	0	2	29	0	5	23	0	2	16	0	4	12
9	0	3	24	0	0	16	0	5	25	0	5	21	0	4	26	2	4	10
10	0	5	21	0	0	6	0	0	16	0	0	7	0	3	17	0	5	5
11	0	0	12	0	2	31	0	1	8	0	2	6	0	3	11	2	6	5
12	0	1	12	0	1	23	0	0	5	0	3	22	0	2	16	0	5	3
13	0	4	13	0	0	14	0	1	4	0	2	15	0	5	9	0	2	15
14	0	0	6	0	3	9	0	0	3	0	1	12	0	5	1	0	2	15
15	0	0	3	0	0	5	0	0	5	0	2	13	0	4	17	0	4	13
16	0	0	14	0	0	13	0	2	21	0	0	7	0	1	18	0	4	21
17	0	3	25	0	1	10	0	1	17	0	2	13	0	3	11	0	3	22
18	0	3	29	0	0	14	0	0	11	0	1	20	0	2	10	0	3	11
19	0	3	22	0	2	10	0	0	4	0	3	31	0	3	4	0	3	17
20	0	2	17	0	0	8	0	2	3	0	3	21	0	4	6	0	2	8
21	0	0	13	0	0	8	0	0	9	0	3	24	0	1	5	0	3	8
22	0	3	19	0	0	14	0	3	29	0	2	7	0	0	12	0	5	6
23	0	0	11	0	0	8	0	0	15	0	2	1	0	3	26	0	5	9
24	0	0	7	0	0	6	0	2	17	0	2	8	0	3	5	0	5	6
25	0	0	11	0	1	15	0	0	9	0	1	8	0	5	3	0	3	8
26	0	0	8	0	0	18	0	1	7	0	2	23	0	3	18	0	3	8
27	0	0	4	0	1	16	0	2	9	0	2	13	0	3	8	0	3	4
28	0	0	4	0	0	5	0	3	35	0	0	10	0	4	19	0	5	6
29	0	1	22	0	0	10	0	4	13	0	3	13	0	4	6	0	3	8
30	0	2	23	0	0	6	0	5	28	0	0	6	0	2	16	0	4	3
31	0	0	16	0	2	20				0	4	3				0	4	5
MEAN	0	1.2	15.0	0	0.9	13.2	0	1.5	15.3	0	2.4	15.1	0	2.9	12.3	0.1	3.7	9.5

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DATE	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP	IP	IA	ΣKP
1	2	5	6	0	3	7	0	4	13	0	0	8	0	0	7	0	0	10
2	0	4	20	0	4	5	0	2	15	0	0	4	0	0	3	0	0	12
3	0	5	11	0	5	9	2	3	31	0	0	5	0	0	5	3	0	12
4	0	3	9	0	1	19	0	5	22	0	0	13	0	0	8	0	1	19
5	0	3	5	0	4	11	0	1	13	0	2	6	0	3	29	0	2	12
6	0	0	4	0	5	20	0	0	9	0	0	14	0	0	13	0	1	10
7	0	4	9	0	5	32	0	3	14	0	0	15	0	0	10	0	0	6
8	0	4	21	0	3	18	0	2	4	0	0	7	0	2	17	0	0	16
9	0	2	14	0	3	19	0	2	8	0	0	18	0	4	18	0	0	21
10	8	3	11	0	3	21	0	0	3	0	0	10	0	5	14	0	0	3
11	6	2	3	0	3	18	0	2	7	0	0	13	0	0	3	0	0	9
12	0	2	19	0	2	8	0	3	9	0	0	13	0	1	9	0	0	6
13	0	4	21	0	3	8	0	2	17	0	0	10	0	0	5	0	0	3
14	0	6	13	0	0	20	0	3	13	0	0	10	0	0	5	0	2	13
15	0	6	12	0	5	19	0	2	20	0	0	8	0	0	8	0	1	24
16	3	5	5	0	4	13	0	0	8	0	0	7	0	2	23	0	6	45
17	0	4	17	0	3	5	0	2	10	0	0	15	0	1	11	0	6	32
18	0	4	10	0	3	7	0	0	2	0	3	40	0	0	8	0	0	17
19	0	3	9	0	0	7	0	1	8	0	5	22	0	0	4	0	0	4
20	2	3	11	0	2	11	0	1	10	0	0	18	0	0	7	0	0	3
21	0	2	14	0	3	25	0	0	15	0	0	6	0	0	11	0	0	2
22	0	4	25	0	3	10	0	1	11	0	0	9	0	0	12	0	0	7
23	2	3	15	0	3	24	0	8	30	0	0	9	0	0	10	0	0	5
24	0	5	3	0	3	19	0	3	20	0	0	10	0	0	12	0	0	5
25	0	6	3	0	4	19	0	4	25	0	0	8	0	0	5	0	3	16
26	0	5	6	0	4	15	0	3	21	0	0	12	0	0	8	0	1	18
27	0	4	12	0	2	17	0	4	17	0	0	10	0	0	12	0	1	12
28	0	2	10	0	1	13	0	0	9	0	0	6	0	0	11	0	0	6
29	2	4	9				0	2	12	0	0	9	0	0	6	0	1	20
30	0	4	8				0	0	4	0	1	10	0	0	5	0	2	22
31	0	4	5				0	0	8				0	0	8			
MEAN	0.8	3.7	11.0	0	3.0	15.0	0.06	2.0	13.2	0	0.4	11.2	0	0.6	9.9	0.1	0.9	13.0